Information Technology in Hospital Management during an Epidemic and Pandemic

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Abstract **- Hospitals assume a basic function inside the wellbeing framework in giving fundamental clinical consideration to the network, especially during a plague or a pandemic. Pandemic readiness arrangement is significant for guaranteeing wellbeing and other basic frameworks keep working during a pandemic, in this manner lessening the monetary and social cost [1]. While data frameworks probably will not have the option to explain the emergency legitimately, we accept that we can give information that may be useful in the battle against pandemics. This work proposes a powerful arrangement on the plan, use and effect of data frameworks during pandemics. The speed at which pandemics has arisen and scattered, we accept that data frameworks analysts would now be able to assume an imperative job. Utilization of current data advances can help beat pandemic for the time being and are additionally well-suited to inspect how best we can use innovation to recuperate over the long haul. It is frequently the social and authoritative parts of these innovations and their usage that will characterize achievement in pandemic fight, and it is these angles instead of the advancements themselves that are generally testing. Understanding the part of Machine Learning and AI in pandemic related practices is a basic case of this test.**

Index Terms **– Epidemic, Pandemic, Artificial Intelligence, Machine Learning, Information Technology.**

I.INTRODUCTION

Information technologies are being harnessed to support and enhance the public-health response to pandemic worldwide, including population surveillance, case identification and contact tracing. The future of public health will become digital, evaluation of information technologies to strengthen pandemic management, and future preparedness for infectious diseases [2]. A public-health solution for pandemic management is to understand infection transmission in time, place and person, and identification of risk factors for the disease to guide effective interventions. We propose an answer that is a sort of the utilization of data and correspondence advancements (ICT) over the entire scope of capacities that influence wellbeing [4]. Pandemic readiness evaluation helps the key leader at a medical care association to be all around educated regarding inadequate zones, and thusly fill in as a guide for preventive activity to battle the peril [5]. Computerized wellbeing innovation can give pandemic system and reaction in manners that are hard to accomplish physically. With the appearance of new innovations like AI and Machine learning, can help identification of the pandemic sickness in the primary stage, so we can give the best solution for improving the opportunity of endurance. Upgrading the recuperation rates certainly is the main achievement choice during such unsafe circumstances.

We can execute the arrangement in such a manner, which helps in forecast of pestilence patterns, following of close contacts, and distant determination. Discovery of pandemic will be the first and the most important stage as it will help in snappy finding, expanding the odds of endurance. Because of the expansion in the quantity of confirmed cases and passing during the pandemics, both clinical staff and general society have encountered mental issues, including tension and sadness. Consequently, for patients with persistent sicknesses, home conveyance administrations gave by web clinics are additionally in extraordinary interest during the episode of pandemic infections. Preventing the spread of infectious disease to hospital staff, patients and visitors during pandemic situation requires appropriate measures. Hence, information technology in hospital management is very important in fighting pandemic battle. Through proper utilization of technology in hospitals, we can definitely improve the recovery rate.

II. LITERATURE SURVEY

Pandemic situation like COVID-19 affects remains a global threat. Even in developed nation this pandemic situations show that there is a shortage of trained clinical staff, there is a huge gap between demand and supply of medical equipment, there is also a shortage of space [14]. COVID-19 pandemic also exposed the government leadership and emphasized the need to adopt digital technologies. When we going to handle pandemic situation there should be proper policy coordination, should be collaboration among multiple government agencies, NGOs, regulators and patients groups. Study shows that public-health always been under funded as compared to other areas. To handle the epidemic and pandemic situation we must invest in digital canters of excellence at local and national level [15]. Tran et al. [10] determine the clinical evidence of acute respiratory infections (ARIs) transmission to health care workers who caring that patient that goes under Aerosol generating procedures (AGPs) and compare it with those health workers who caring the patients that are not going under AGPs. Heath care workers (HCWs) are always at risk at their workplace for many infection diseases that transmitted from old patients.

Digital technologies are used at large scale to support public-health. Digital technologies help in pandemic preparedness and align the international strategies for future preparedness. We used digital technologies for infection identification, contact tracing and population surveillance. Pandemic like COVID-19 confirmed the need of data sharing across the globe. We get the rapid responses to strengthen the pandemic management through mobile phones, through online datasets and other low-cost computing resources. However, privacy, legal and ethical concerns are always present [12]. As per data given by world health organization (WHO) COVID-19 cases are still increasing. To handle this epidemic situation and overcome from medical infrastructure shortage there is a need to reconstructing available hospital/hospital infrastructure into an infectious disease hospital (IDH) hospital [13]. Since 1988, European Commission starts taking initiative for R &D that supports ICT for eHealth. These include healthcare electronics records, regional and national digital health network and telemedicine in homecare. eHealth already shown various benefits like- improved cost and quality containment, eCare-centre for citizens, help health care workers to work more effectively and safely on patients. E-Health tools support health care workers in clinical preparedness by using digital data of patient, electronics resources for education and training and allow access possibilities at regional and national level. [9]. Dewar et al. [11] performed a study to investigate influenza pandemic preparedness in Australian health care sectors and examine its planning and management efforts during pandemic situation. An influenza pandemic causes significant disruption on social and economical system. Their study shown that half of clinical staff may not respond during an influenza pandemic. Workforce planning critically affected in rural areas during pandemic and this workforce shortage indicates that even metropolitan hospital plans failed during pandemic. So, there is a need to include education and communication plans that minimize the gap among clinical and non-clinical staff and thus help to reduce staff absenteeism effect.

III. PROPOSED METHODOLOGY

We propose to divide our pandemic situation into four phases on the basis of their spread. Description of these four phases is given below:

1.Initial Phase: This is the first phase when the symptoms of pandemic begin to appear and show its effect. Number of cases is not much but can spread rapidly if not curbed properly. If detected, recovery is more rapid if given proper treatment. This is the phase where we can stop the pandemic to spread as it is not passes to many cities. There is only limited number of cases present. If we restrict the movement of people from the affected area, we can put a stop on this to become a global pandemic.

2.Alert Phase: If the disease in the person is confirmed to be the pandemic disease. Now here risk due to physical contact increases and the person needs to isolate him. Graph grows up rapidly. Number of cases is increasing rapidly. The disease is now being transmitted to more geography. The carrier has now travelled to few more cities/countries. Even at this point, we can put a curb to spread further to those countries which are not affected.

3.Critical Phase: Risk of spreading the pandemic globally increases and contamination may spread through air or water. In this phase, many cities/countries are now being affected. Things are getting worse. Daily numerous new cases are coming

up. Almost 50% of the countries are now affected. Cases are coming from across the globe. We need to check each and every individual as we are not sure if some has caught the infection or not.

4.Transition Phase: The disease if likely to be in its last stage, where there are travel restrictions, and patient is on Life survival system. Complete lockdown has been imposed. Schools, markets and Offices have been shut down. We are just waiting for the vaccination to be ready. At this point, it has become unstoppable.

An online appointment with a specialist or doctor is the need of an hour today during the pandemic circumstance. The application must have the option to deal with measures going from the specialist's inquiry cycle, check enlistment, line number settings and notices, simple to-get to clinical records, and talks among specialists and patients. This, consequently, helps in making basic data all the more promptly accessible for audit on an individual premise. This application improves medical services by making promptly accessible directions for patients. Most of what specialists tell patients is failed to remember when they leave the medical clinic and half of what they recollect is erroneous. Better correspondence can likewise happen through this application before patients enter their doctor's office. This innovation can be utilized to send tolerant updates and diminishing the quantity of missed arrangements, which prompts a decrease in costs.

Phase Name	Description
Initial Phase	Period before a Pandemic shows its effect, usually in this phase, symptoms begin to show and if detected, recovery is more rapid if given proper treatment.
Alert Phase	If the situation worsens during the initial phase, alert phase starts post it. Risk due to physical contact has to be taken care of in this phase.
Critical Phase	Community level contamination that includes pandemic spread through air or water. Here risk of area-to-area contamination prevails.
Transition Phase	The disease if likely to be in its last stage, where there are travel restrictions, and patient is on Life survival system.

Table-1: Phases for Pandemic Identification

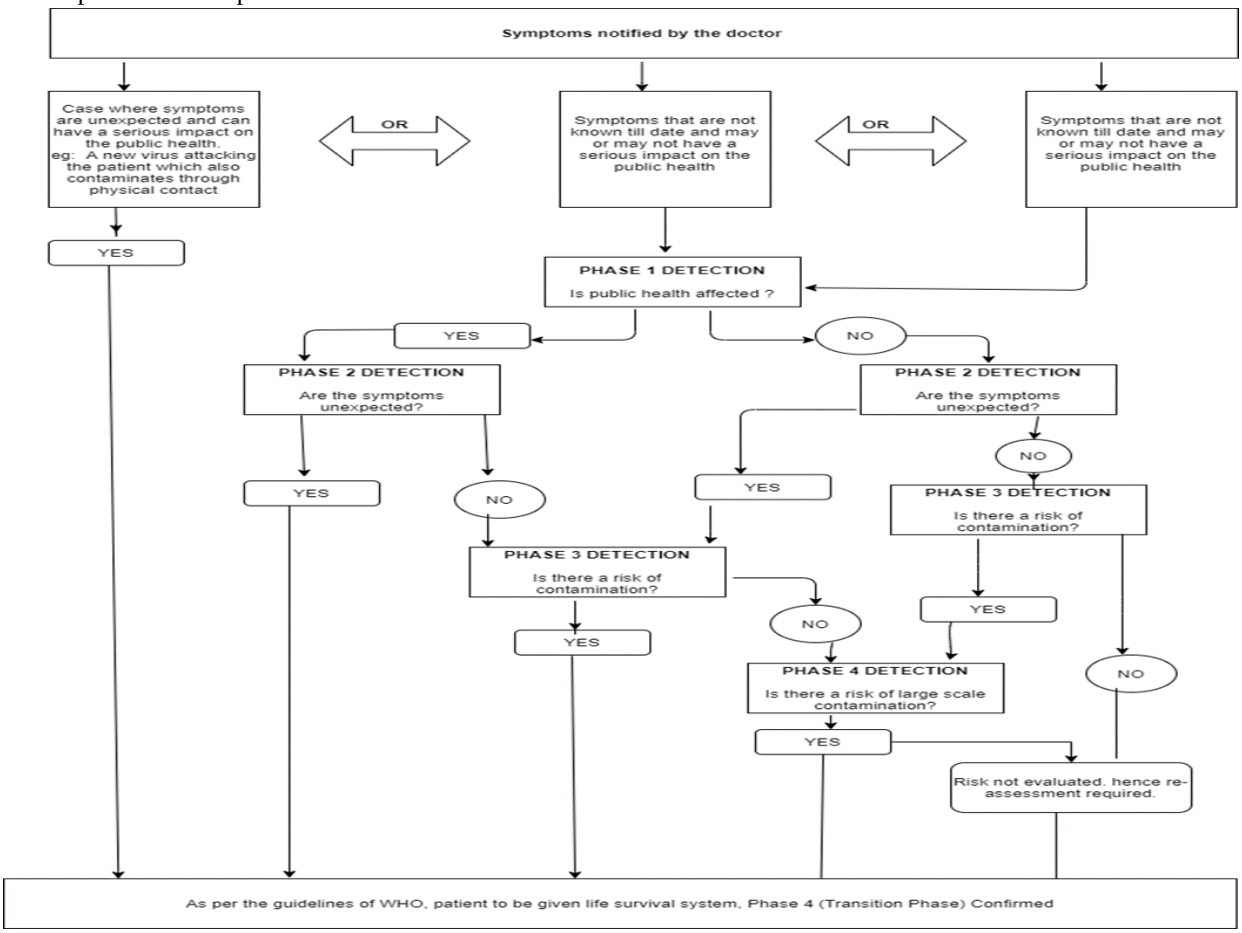

Fig1: Decision Oriented Pandemic Detection Flowchart

IV. CONCLUSION AND FUTURE WORK

In this paper, we propose to make a pandemic detection workflow that will help us to detect the pandemic and its related phase. The workflow is based on the symptoms the patient shows. The questions would be asked at each step during the phase detection and once detected; further actions for the treatment of the patient would be taken into account.

The decision-oriented phase detection is very helpful in categorising the patients on the basis of the symptoms. Hence it makes easier to provide the necessary treatment and facilities to the patients.

Clinic and the executives readiness is yet an issue and this paper would be a helpful for medical clinic directors and strategy engineers, to survey and improve their future endeavours in overseeing pandemics.

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